

SOFTWARE DEVELOPMENT AND COMPUTER PROGRAMMING CAPABILITIES



Systems Approach to Software and Programming Problems

AUERBACH Corporation is a systems-design and consulting organization whose specialty is information—its collection, processing, storage, retrieval, dissemination, and use. AUERBACH was the System Designer for the OPCON Centers, the largest integrated multi-computer facility in existence. It designed the multi-computer data-processing and checkout system for BMEWS, the Ballistic Missile Early Warning System. AUERBACH also assisted in the design and implementation of the computer-controlled message-switching centers in the Datacom high-speed digital communication network. It is Reliability Contractor and Software Monitor to the Defense Communications Agency for the implementation of the world-wide AUTODIN communications system.

Out of this type of work has evolved a unique AUERBACH approach to the solution of difficult software/programming problems—an approach based upon a thorough understanding of the entire system, its distinctive requirements and operating environment; an extremely detailed knowledge of the performance and design of a broad range of computer equipments; and the capacity for creative contributions to the state of the computer programming art.

What this approach means to AUERBACH clients is assurance of maximum utility of computer hardware, maximum simplicity of system operation from both a programming and non-technical user viewpoint, and maximum payoff per dollar of equipment investment.

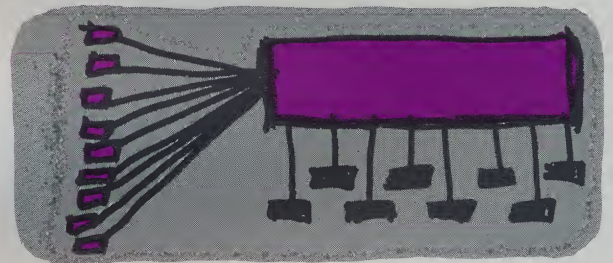
Typical Jobs

PROBLEM: EXECUTIVE CONTROL PROGRAM

A data-processing service organization required a full-scale executive control program to permit the integrated use of a multi-computer complex. Centralized control had to be provided for a facility of nine computers and over 100 peripheral devices.

AUERBACH SOLUTION

Developed a two-level executive program that permits entire complex to be operated as a single integrated system under centralized automatic control or as several isolated and independent sub-systems, each under its own control. One level of the executive program assigns, allocates, and schedules subsystems; the other initiates, controls, and terminates job programs. The broad range of services provided at the job-initiation-and-control level of the executive program succeeds in simplifying system operation sufficiently for non-technical operators to make full use of the hardware facilities.



BASIC ACCOMPLISHMENTS

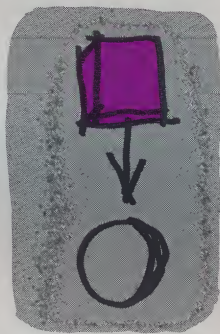
- Designed job-request language for multi-computer system control.
- Programmed multi-computer master-control executive routine.
- Analyzed and coded programs for sub-system control and inter-computer communications.
- Established system conventions for data and program files.

PROBLEM: SIMULATOR PROGRAM

A computer manufacturer wanted a simulator program to permit his computer to operate programs written for a competitive computer. The logical design of the two computers was fundamentally different. The client's computer was a general-purpose machine, which had to be programmed to simulate separate plugboards for input/output formatting and processing operations.

AUERBACH SOLUTION

Designed an assembler program to translate the wiring patterns of the plugboard machine into the instruction sequences of the stored-program machine. Specified a language to describe the central-processor, mass-storage, and input/output functions of the competitive machine. The simulation software accepts any program written for the plugboard machine and produces an object program that runs faster than the equivalent operation on the plugboard machine. The simulation is thorough enough to permit the operator to run the new machine without changing his operating procedures.



BASIC ACCOMPLISHMENTS

- Formalized simulation of hardware logic and functions.
- Developed assembler-based, in-line simulation technique.
- Developed assembly language to represent operations of competitive machine.
- Designed and programmed assembler to provide machine simulation.

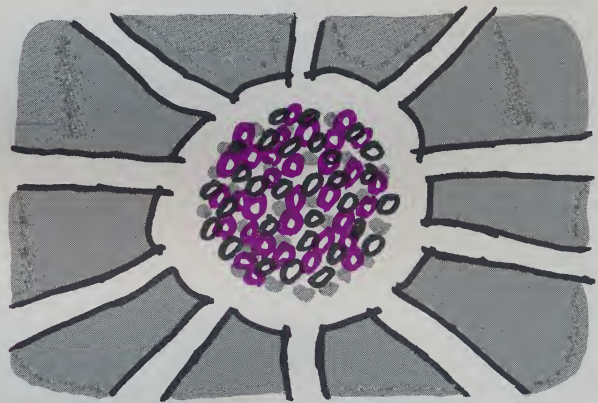
PROBLEM: DATA-STORE MANAGEMENT

An organization with a large, extremely heterogeneous and dynamic data base wanted a mechanized central file to facilitate efficient data management and to provide rapid retrieval and processing services to diverse users.

AUERBACH SOLUTION

Developed a data structure that encompasses both fixed and variable data elements and enables them to be nested to any arbitrary depth in a central file. Devised a data-descriptive language that permits simplified definition of terms, records, and files.

Designed an operating system for the central file that included English-name retrieval dictionaries for users; directory indices linking the logical and physical structures of the data base; and a job-request language for controlling programs and data.



BASIC ACCOMPLISHMENTS

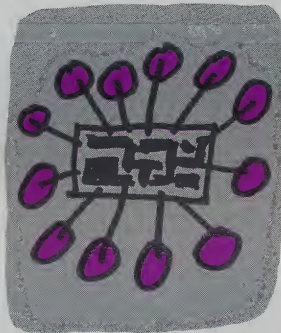
- Developed unique variant of multi-list data structures involving a directory hierarchy.
- Designed machine-recognizable recursive language.
- Implemented generalized supervisory system of control programs.

PROBLEM: TIME-SHARED ASSEMBLY PROGRAM

A scientific computing center wanted an assembly program to provide users with easy access to its time-shared computer system. Automatic program segmentation and floatability had to be provided to insulate the users from the complexities of the system. This had to be accomplished within a specific executive-system environment that imposed rigid constraints upon both the assembler and the object programs.

AUERBACH SOLUTION

Designed an assembler that segments object programs either automatically or under programmer control and produces transfer tables for between-segment referencing. The object-program format allows program interruption and movement from one memory area to another during processing. These programs are linked to the executive system in a way that provides the user with essential input/output and job-control services. The assembler itself is designed to operate as a segmented-floatable program.



BASIC ACCOMPLISHMENTS

- Developed dynamic storage-allocation techniques.
- Developed automatic fixed-size segmentation techniques.
- Optimized program segmentation and data packing.
- Developed inter-segment transfer tables and programs.

A Complete Service

AUERBACH's software section is organized to provide clients with the closest possible technical liaison to assure the free exchange of technical information. This means that AUERBACH clients maintain full technical cognizance and control of projects, so that they may be sure of having the information and experience necessary to operate and maintain delivered programs.

AUERBACH is equipped to take full responsibility for any or all of the following parts of the design-implementation cycle of software/programming projects:

Problem Definition
Design of Custom User Languages
Design of Solution Algorithms
Programming Analysis/Flowcharting
Programming
Coding
De-bugging/Checkout
Installation
Personnel Training
Documentation

A representative of AUERBACH will be pleased to discuss your specific needs and problems in detail . . . at your convenience.



AUERBACH SOFTWARE/PROGRAMMING SERVICES

Multi-Program and Multi-Processor Executive Systems

Real-Time Control Routines

Recovery & Rollback Concepts and Programs

Job Allocation Programs

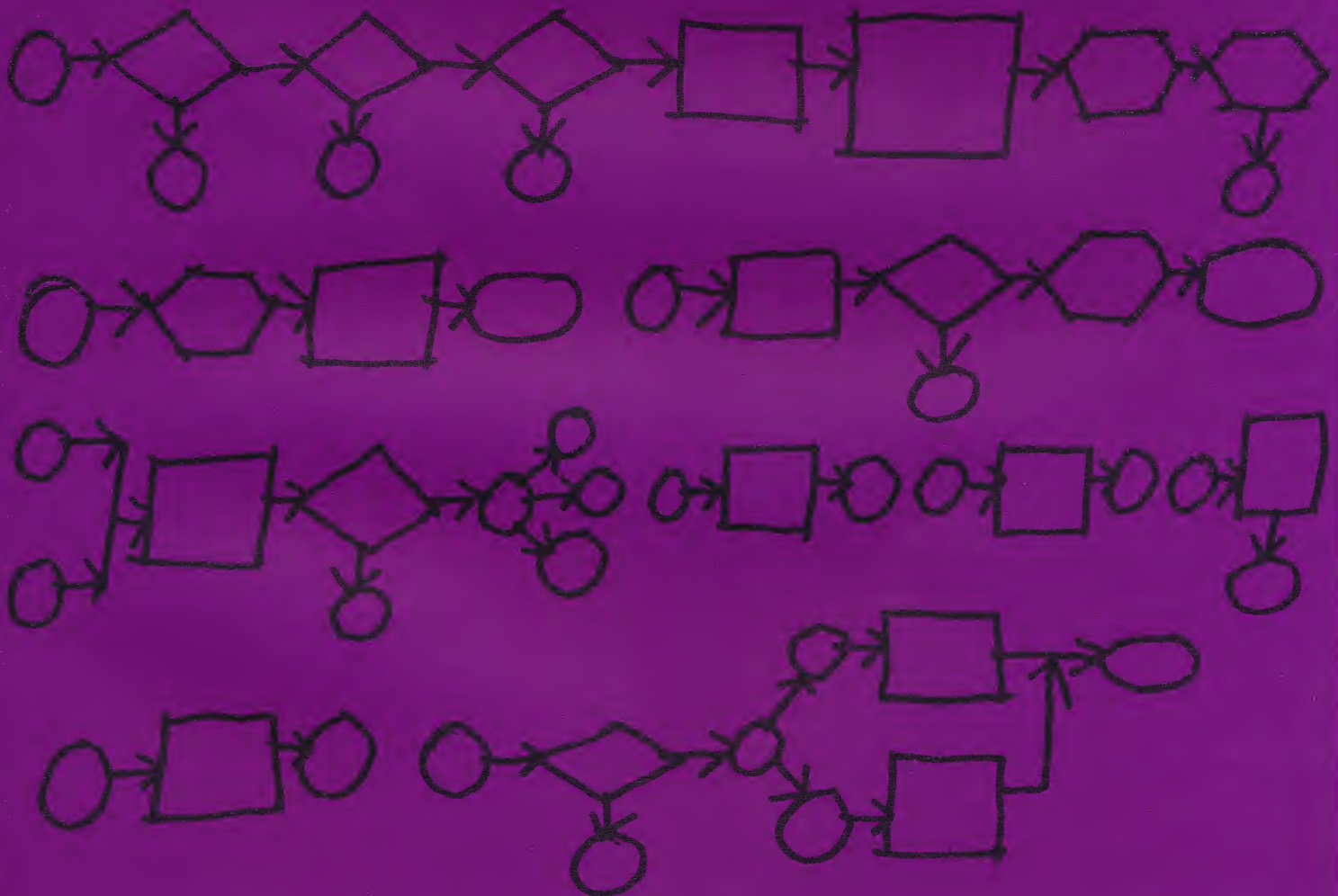
Internal Recordkeeping Programs

Assembler/Compiler Systems

Information Storage and Retrieval Systems

Simulation Programs and Language Design

Data Base Design





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